



Natural gas for sustainable power generation: eni's experience

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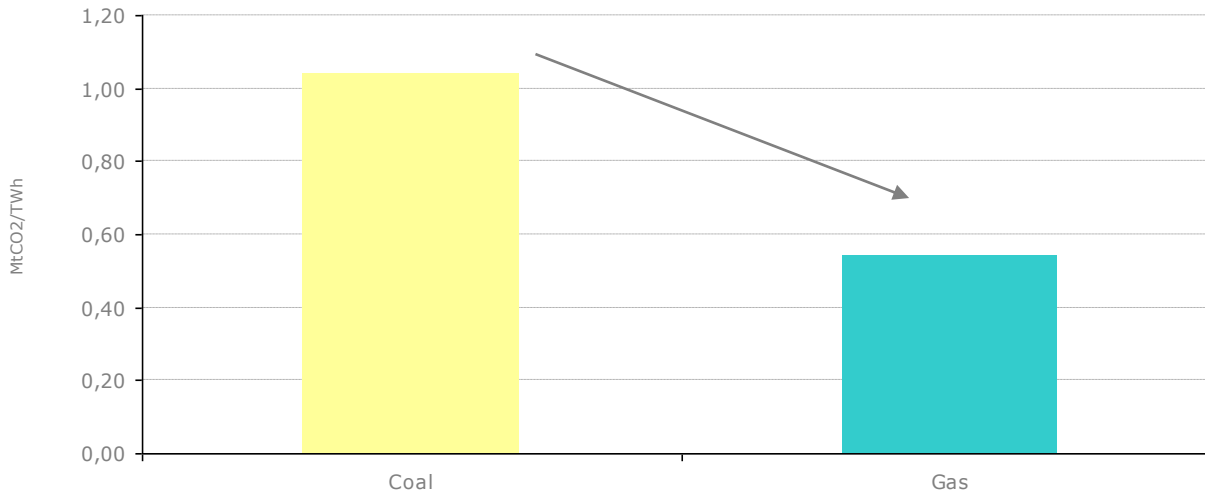
IPIECA - COP 18 side event

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www.eni.it

environmental benefits: natural gas vs coal

GHG Emissions of Power Generation by fuel



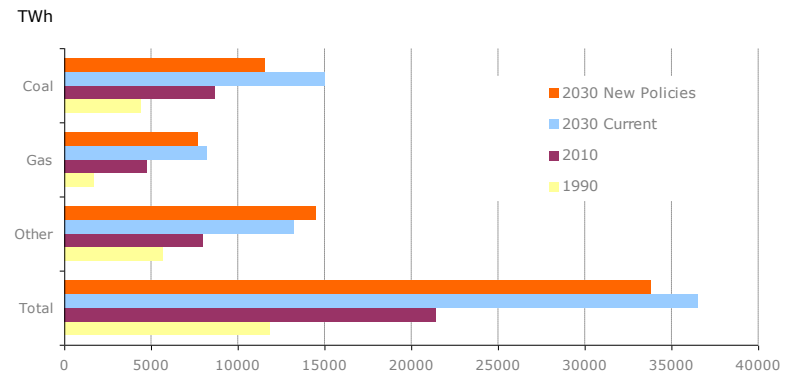
- natural gas GHG emissions are the half of coal
- fossil fuels plants highest efficiency: 60% CCNG vs 45% coal plants



use of natural gas in the power sector

- in 2030 power generation will increase more than 12.000 TWh vs 2010
- in 2030 gas generation increases more than 60% vs 2010
- also the share of natural gas will slightly increase in 2030

Power generation trends by source

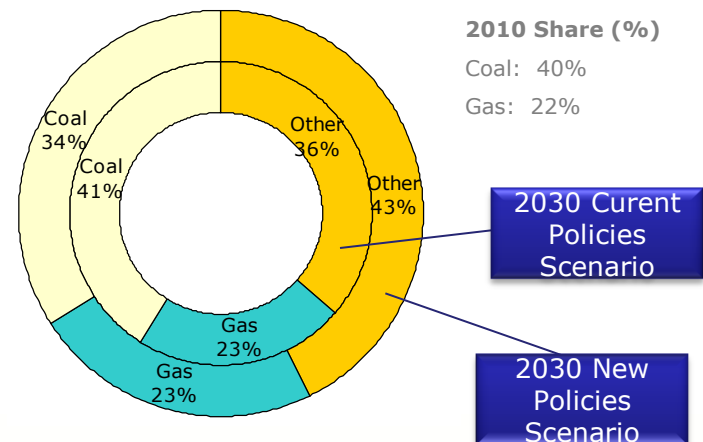


Total power 2030 (TWh)

New policies scenario : 33.789

Current policies scenario: 36.492

Power generation shares by source in 2030

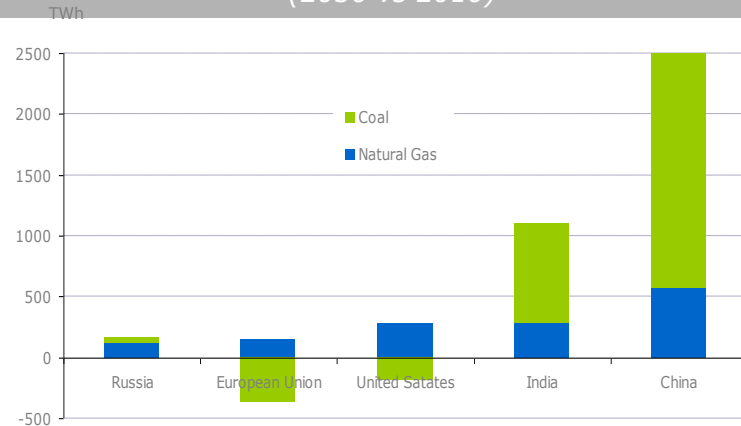


emission trends in the power sector

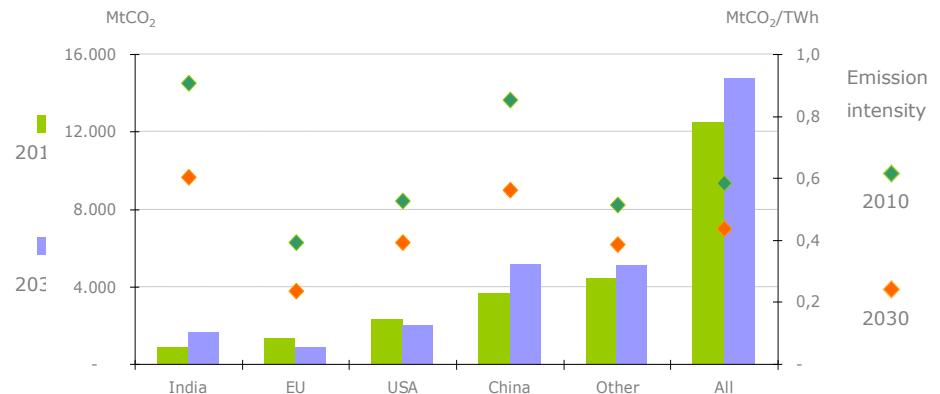
- natural gas use in the power sector will significantly increase not only in OECD but also in China and India

- natural gas broader use will contribute to improve the global power sector CO₂ KPI

New Natural gas-fired power generation by region (2030 vs 2010)



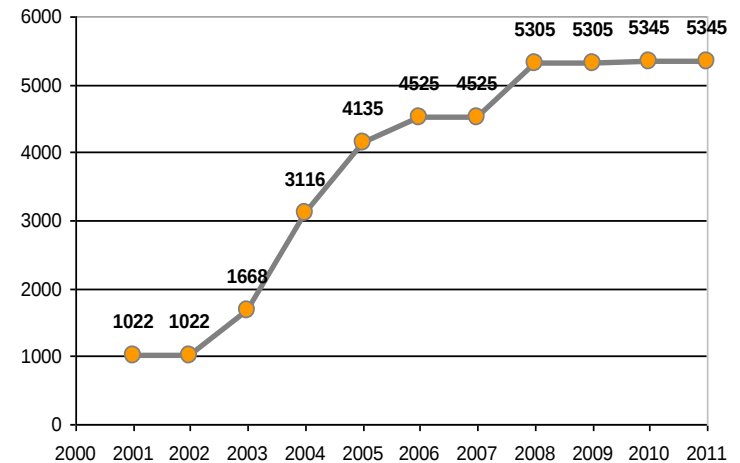
CO₂ emissions in power sector and emission intensity by region



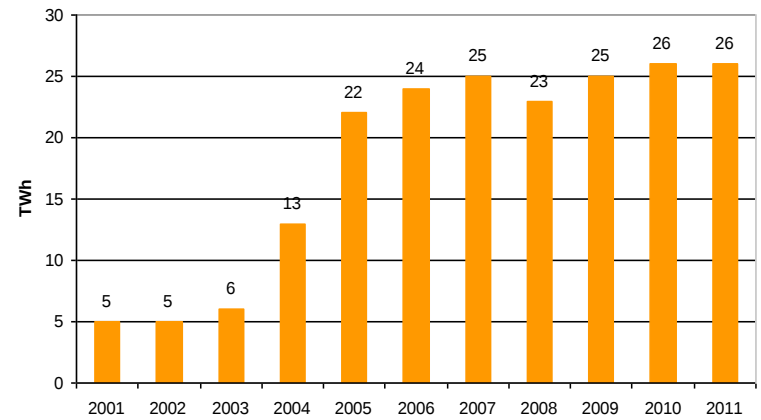
eni's power company

- enipower has completed in 10 years a 2,3 billion € investment plan with gradual repowering of the traditional plants with F-class natural gas combined-cycles
- currently the company owns 7 power stations located in petrochemical sites and refineries in Italy with some 5.3 GW installed capacity
- enipower is Italy's top producer of process steam (CHP) and the second largest electricity producer

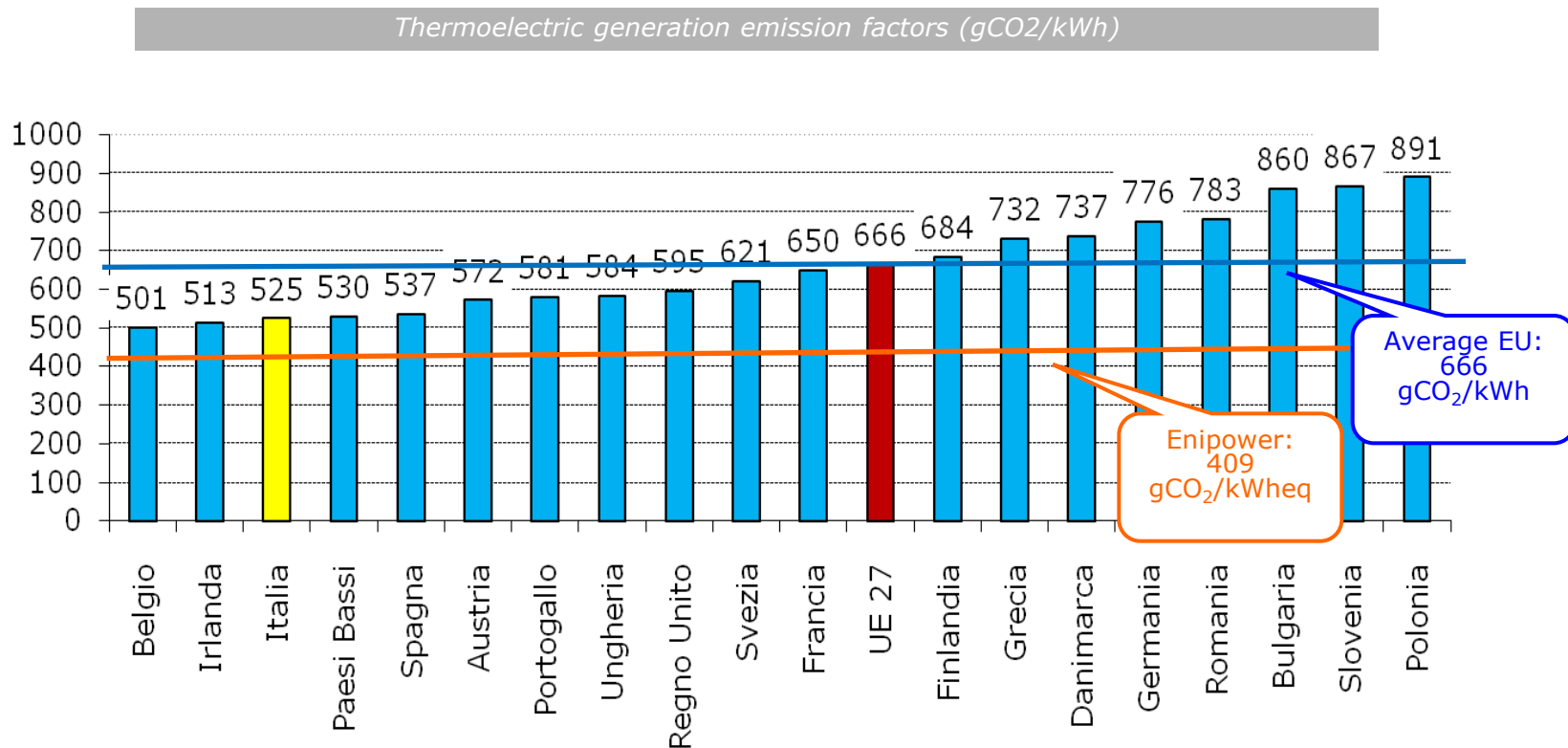
Installed capacity [MW]



Power production [TWh]



enipower performance



- thanks to CCNG and CHP **enipower emission factor is lower** than the **Italian average of 22%** and **EU average of 38%**



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Source: Terna (2010)

comparison of incentives in Italy: CHP vs PV

■ PV

- Power (end 2011): 12.8 GW
- Energy Production (end 2011): 10,8 TWh
- Annual incentives (end 2011) : 3800 milion euros (for 20 years!)
- Average incentive on MWh: about 5 times wholesale price
- Costs per avoided tCO₂ (based on Italy's average emission factor): 652€/t

■ CHP

Considering Avoided Emissions and existing indirect support mechanism (avoided costs of buying Green Certificates):

- Costs per avoided tCO₂: about 25% of PV's value
- Average incentive on MWh (2011): about 4% of wholesale price

Zero
from
2015
onward !

■ CHP is a more cost-effective way to reduce emissions



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Source: GSE, enipower estimate

access to energy

- the Government of the Republic of the Congo has decided to develop, in cooperation with eni, an **integrated project for the construction and rehabilitation of power plants** and distribution networks that includes among its objectives the elimination of gas flaring
- an example of large-scale investment in energy access
- the total investment in the project has amounted to 1.34 billion US\$
- the project was launched in 2007:
 - construction of the Central Electrique du Congo (300 MW)
 - renewal of the Central Electrique de Djeno (additional 25 MW)
 - system for the treatment and transport of AG form M'Boundi to Djeno
 - development of a natural gas-condensate field
 - rehabilitation of the national grid to support the transmission of electricity
 - rehabilitation of the medium and low voltage electricity network of Pointe-Noire



conclusions

- natural gas fired power generation will play a major role in the future
- eni has invested since a decade in CCNG and CHP plants
- CHP generation represents a very cost-effective option to reduce emissions
- natural gas fired power generation can generate meaningful social and economic benefits
- therefore... natural gas fired power generation represents a win-win solution to foster the economic growth and ensure climate protection





Thanks for your time